Full wwPDB X-ray Structure Validation Report ⓘ

Dec 18, 2023 – 08:59 am GMT

PDB ID	:	2WZ0
Title	:	L38V SOD1 mutant complexed with aniline.
Authors	:	Antonyuk, S.; Strange, R.W.; Hasnain, S.S.
Deposited on	:	2009-11-20
Resolution	:	1.72 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

MolProbity	:	FAILED
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	FAILED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.72 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
7	DSN	F	157	-	X	-	-

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 2620 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called SUPEROXIDE DISMUTASE [CU-ZN].

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	153	Total	C	N	O	S	0	3	0
			1120	685	203	228	4			
1	F	153	Total	C	N	O	S	0	8	0
			1147	702	206	235	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	38	VAL	LEU	engineered mutation	UNP P00441
F	38	VAL	LEU	engineered mutation	UNP P00441

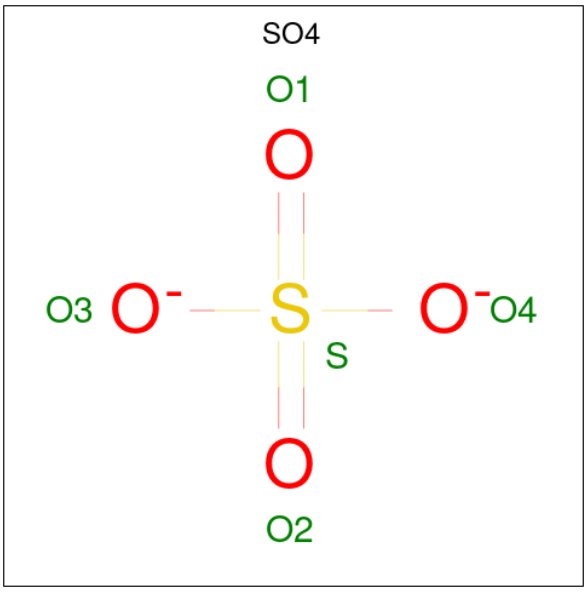
- Molecule 2 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Cu	0	1
			1	1		
2	F	1	Total	Cu	0	0
			1	1		

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

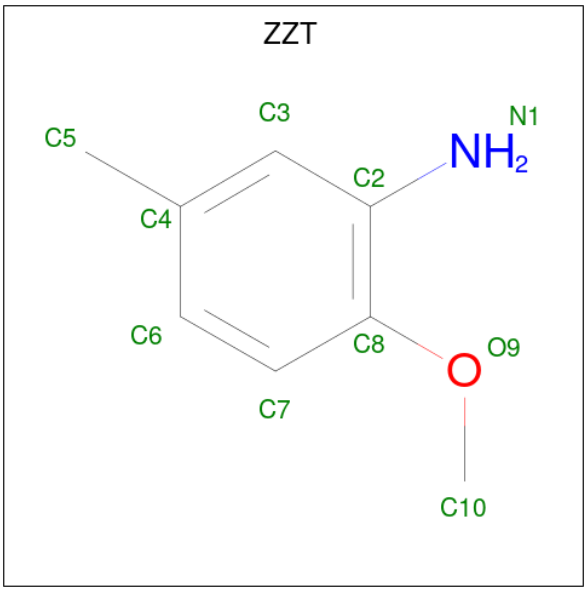
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Zn	0	1
			2	2		
3	F	1	Total	Zn	0	0
			1	1		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0

- Molecule 5 is 2-METHOXY-5-METHYLANILINE (three-letter code: ZZT) (formula: $C_8H_{11}NO$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O 10 8 1 1	0	0

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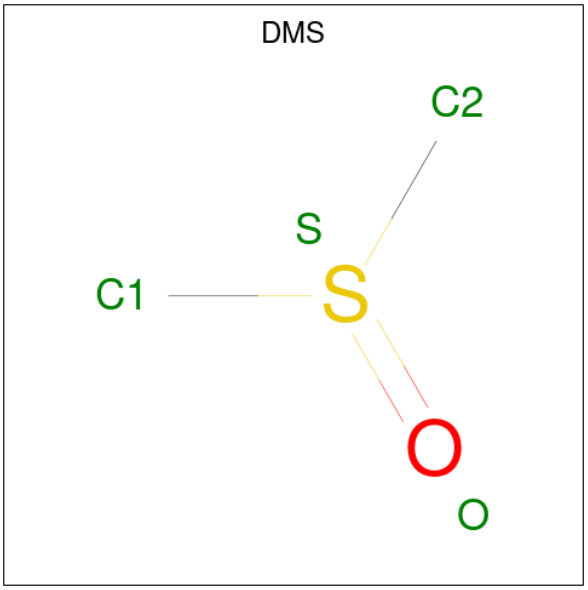
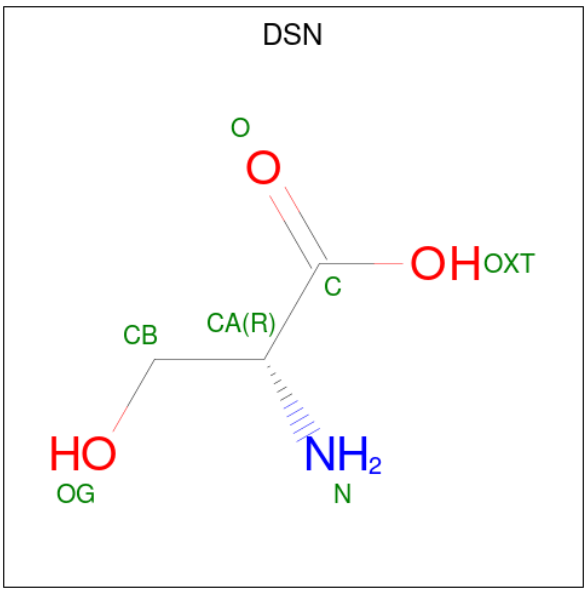
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	F	1	Total	C	N	O	0	0
			10	8	1	1		

- Molecule 6 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C_2H_6OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	F	1	Total	C	O	S	0	0
			4	2	1	1		

- Molecule 7 is D-SERINE (three-letter code: DSN) (formula: $C_3H_7NO_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	F	1	Total	C	N	O	0	0
			7	3	1	3		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	147	Total	O	0	0
			147	147		
8	F	160	Total	O	0	0
			160	160		

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	39.01Å 68.26Å 50.99Å 90.00° 106.15° 90.00°	Depositor
Resolution (Å)	24.00 – 1.72	Depositor
% Data completeness (in resolution range)	98.3 (24.00-1.72)	Depositor
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.82 (at 1.65Å)	Xtriage
Refinement program	REFMAC 5.5.0106	Depositor
R, R_{free}	0.194 , 0.260	Depositor
Wilson B-factor (Å^2)	19.3	Xtriage
Anisotropy	0.314	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2620	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.00% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

4 Model quality

4.1 Standard geometry

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles

4.3.1 Protein backbone

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA

MolProbity failed to run properly - this section is therefore empty.

4.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

4.5 Carbohydrates

There are no monosaccharides in this entry.

4.6 Ligand geometry

Of 11 ligands modelled in this entry, 5 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	DMS	F	156	-	3,3,3	2.55	1 (33%)	3,3,3	0.61	0
4	SO4	A	157	-	4,4,4	0.20	0	6,6,6	0.40	0
4	SO4	A	156	-	4,4,4	0.25	0	6,6,6	0.33	0
5	ZZT	A	158	-	10,10,10	0.78	0	13,13,13	3.80	6 (46%)
7	DSN	F	157	-	5,6,6	2.06	2 (40%)	5,7,7	2.84	4 (80%)
5	ZZT	F	158	-	10,10,10	1.00	0	13,13,13	4.01	5 (38%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	DSN	F	157	-	-	3/6/6/6	-
5	ZZT	A	158	-	-	0/2/2/2	0/1/1/1
5	ZZT	F	158	-	-	2/2/2/2	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	F	156	DMS	O-S	4.19	1.78	1.50
7	F	157	DSN	O-C	3.49	1.32	1.22
7	F	157	DSN	OXT-C	-2.98	1.20	1.30

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	F	158	ZZT	O9-C8-C2	11.97	121.96	114.05
5	A	158	ZZT	O9-C8-C2	10.20	120.79	114.05
5	A	158	ZZT	C2-C3-C4	-5.46	119.75	122.18
5	A	158	ZZT	C10-O9-C8	5.05	125.15	117.53
5	F	158	ZZT	C2-C3-C4	-4.65	120.11	122.18
7	F	157	DSN	OXT-C-O	-3.89	115.26	124.09
5	F	158	ZZT	C10-O9-C8	3.67	123.07	117.53
5	F	158	ZZT	O9-C8-C7	-3.49	118.39	124.37
5	A	158	ZZT	C3-C2-C8	3.19	120.75	118.18
7	F	157	DSN	OXT-C-CA	3.14	124.09	113.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	F	157	DSN	CB-CA-C	3.09	117.08	110.87
5	A	158	ZZT	C7-C8-C2	-2.75	118.76	120.88
5	F	158	ZZT	C8-C2-N1	2.44	121.55	119.46
7	F	157	DSN	OG-CB-CA	-2.38	104.56	110.85
5	A	158	ZZT	O9-C8-C7	-2.29	120.45	124.37

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	F	158	ZZT	C2-C8-O9-C10
5	F	158	ZZT	C7-C8-O9-C10
7	F	157	DSN	C-CA-CB-OG
7	F	157	DSN	O-C-CA-N
7	F	157	DSN	OXT-C-CA-N

There are no ring outliers.

No monomer is involved in short contacts.

4.7 Other polymers (i)

There are no such residues in this entry.

4.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

5.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

5.4 Ligands

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers

EDS failed to run properly - this section is therefore empty.